

Chapter 5

Advanced Gunnery Training System (AGTS)

The AGTS is an M1A2 tank gunnery training device for TC/gunner teams. Its primary purpose is to sustain basic gunnery skills and increase combat gunnery skills. The AGTS places the TC and gunner in a realistically simulated crew station and presents them with a full range of computer-controlled engagement situations. The AGTS produces full-color, computer-generated action scenes in which crew members interact with various target situations. Programmed exercises vary in target type and number, range, vehicle and target motion, visibility, and other complex conditions. The crew is in no danger, no fuel is consumed, and no ammunition is expended. The result is challenging, progressive gunnery training.

AGTS Components

The AGTS, unlike the COFT, is a single-sheltered system. Major components within the training shelter are the crew station, IOS, electronic interface device (EID), SPC, and GPC.

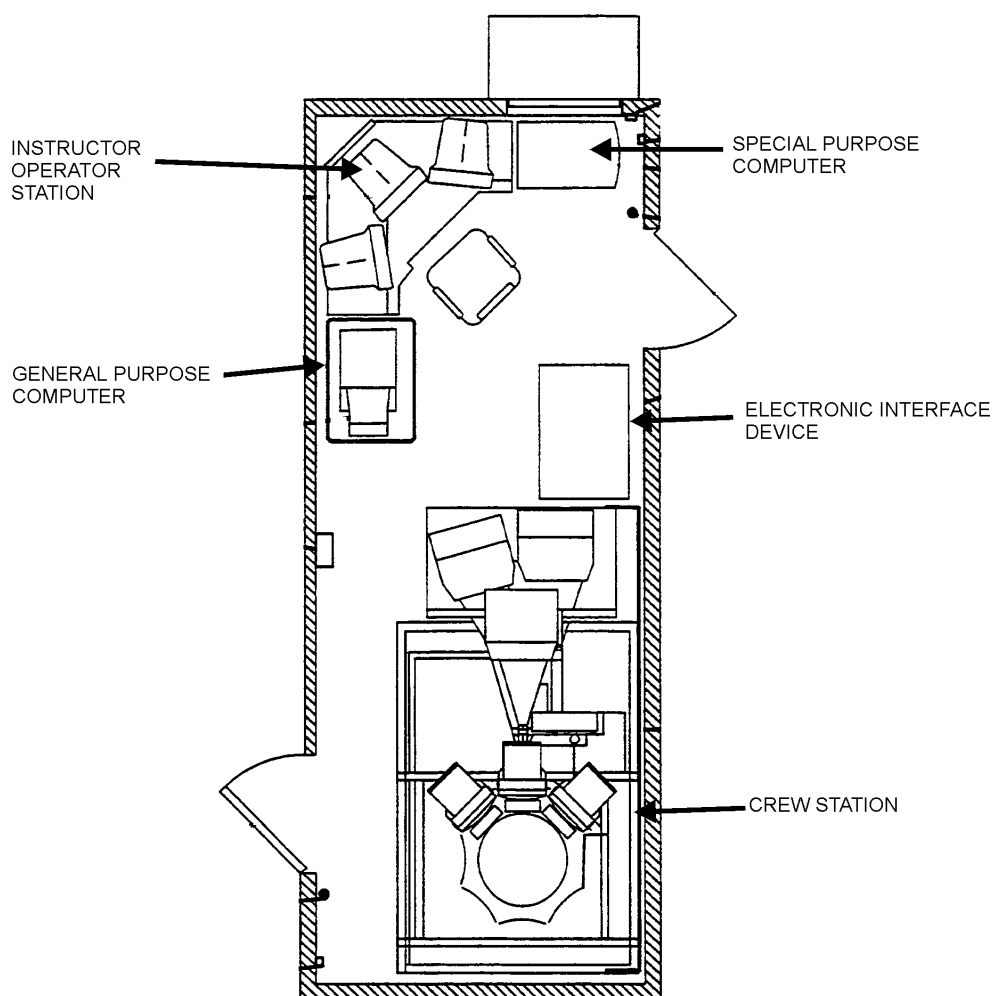


Figure 5-1. Advanced gunnery training system.

CREW STATION

The crew station is designed as a full-size replica of the M1A2 tank commander's and gunner's stations. Controls, indicators, and panels are in the same location as the actual vehicle. The crew station components are designed to provide a high level of form, fit, and fidelity to make sure the tank commander and gunner acquire, identify, and engage targets the same as they would on the actual vehicle. All simulated controls and interface devices of the fire control system accept the same inputs as the actual vehicle.

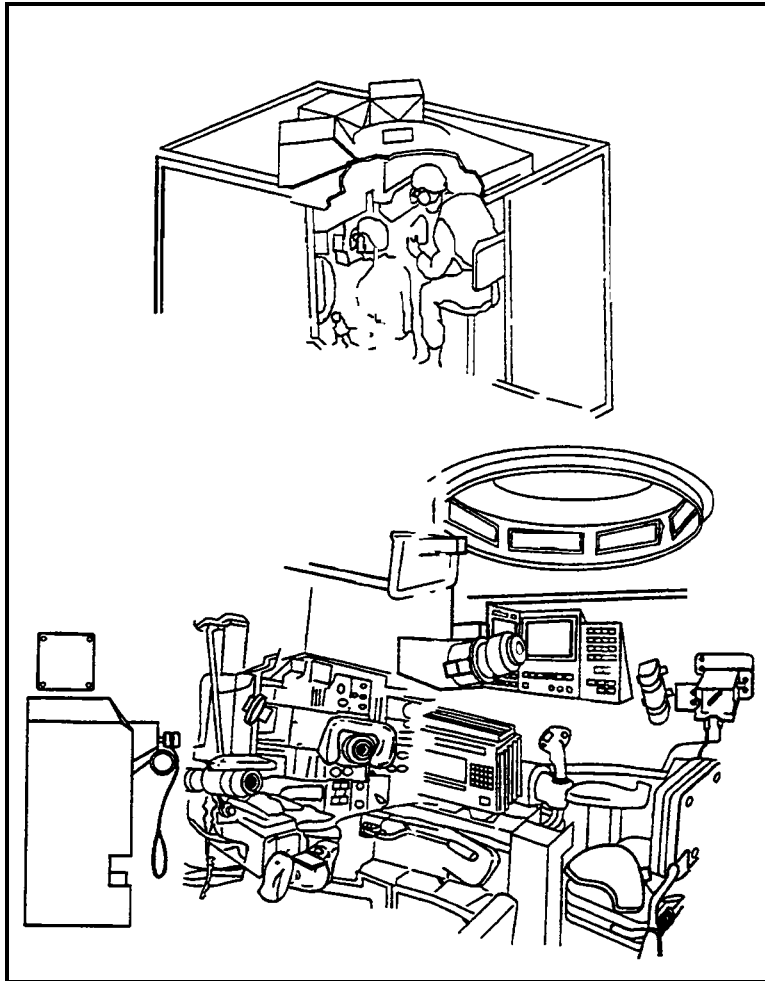


Figure 5-2. AGTS Crew Station.

INSTRUCTOR/OPERATOR STATION

The IOS allows the IO to power up and power down the system, select training modes, perform record management, monitor the crew's performance during a training session, and communicate with the crew.

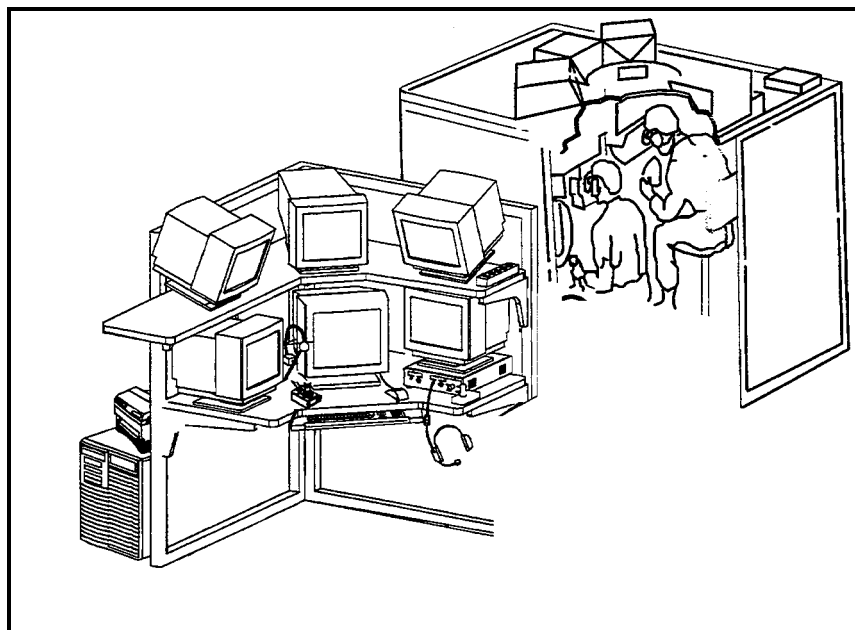


Figure 5-3. AGTS Instructor/Operator Station.

ELECTRONIC INTERFACE DEVICE

The EID provides the interface between the GPC and the crew station switches, controls, and indicators.

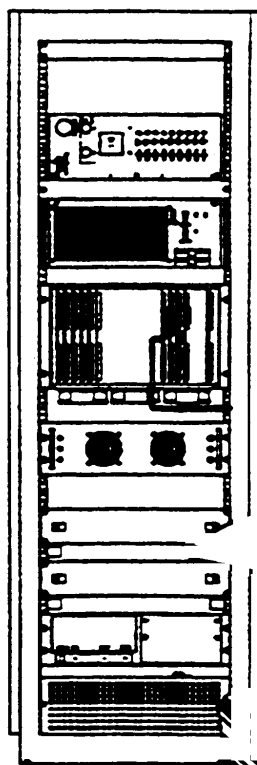


Figure 5-4. AGTS electronic interface device.

SPECIAL-PURPOSE COMPUTER

The SPC contains the electronics for the development of the visual scenes projected into the optical systems of the crew station.

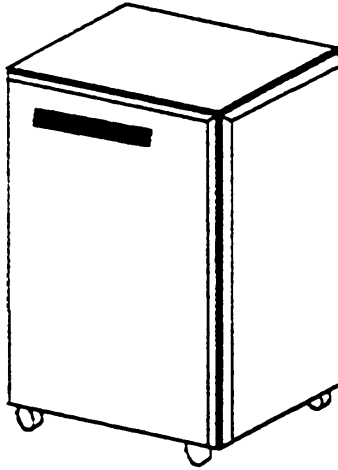


Figure 5-5. AGTS special-purpose computer.

GENERAL-PURPOSE COMPUTER

The GPC provides memory storage, input/output interface, and crew station image generator interface for system power up, system diagnostics, crew training, and system power down.

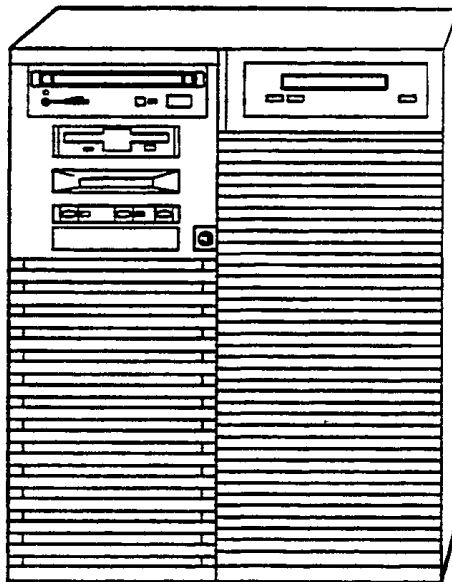


Figure 5-6. AGTS general-purpose computer.

Capabilities and Limitations

Although the AGTS places the TC and gunner in a realistically simulated crew station and presents them with a full range of computer-controlled engagement situations, some functions of the TC and gunner stations are physically simulated and some are not.

CAPABILITIES

The AGTS provides initial, refresher, and sustainment training for tank commander/gunner teams. The system utilizes computer-generated visual scenes, targetry, and special effects to simulate the engagement of targets. The majority of the fire control system is replicated in both physical and functional aspects. The system trains both fully operational and degraded-mode gunnery techniques under a wide variety of conditions.

The system simulates the following visual effects:

- Multiple, single, and delayed targets (M1A1, M1A2, T-80, truck with snapper ATGM, T-72, BMP, BMP2, BTR, BRDM, ZSU-23-4, HIND-D, MI-8C, truck GAZ-69, rocket-propelled grenade [RPG] team, troops, M1, M2/M3, M60A3, AH-64, Leopard 1 and 2, Marder, AMX-10, AMX-30, Chieftain, Challenger, M-113, and Merkava).
- Varied ranges, speeds, exposure times, and reactive targets.
- Own vehicle, moving and stationary.
- Primary, alternate, and subsequent defensive firing positions.
- Round tracer.
- Scene obscuration.
- Round impact and effect on target.
- Round impact on terrain.
- Catastrophic kill.
- Mobility kill.
- Burning wreck models.
- Smoke from grenade launchers.
- Enemy direct and indirect fire.
- Near miss on own vehicle.
- Own vehicle hit and kill.

The system provides the following visibility conditions:

- Day unlimited.
- Day with haze (European data base).
- Day with dust (desert data base).
- Day with fog.
- Dawn and dusk.
- Night unlimited (thermal).
- Night with thermal clutter.
- Mortar illumination.

The system provides the following aural cues to the crew:

- Enemy fire, including artillery.
- Round loading and reloading sounds.
- Loader's "UP."

- Main gun, M240, and M2 machine gun firing.
- Track clatter.
- Engine and transmission sounds.
- Gun jump.
- TIS cooling fan.
- NBC system.
- CITV fan and shutter
- Own vehicle hit and kill.
- Friendly fire.

LIMITATIONS

The following items are not functionally simulated on the AGTS:

- TC's periscopes. The three forward unity periscopes are operational; the other periscopes around the TC's hatch are not functional.
- TC's hatch will not open.
- M2 machine gun is not replicated on the AGTS.
- Not all circuit breakers are supported from the display panels.
- Hydraulic pressure gauge.
- Gunner's unity periscope.
- Ammunition temperature gauge.
- Gunner's TIS focus knob.
- M240 machine gun. The M240 machine gun is partially simulated. Manual fire cannot be accomplished. The charging handle can be used to apply immediate action for simulated stoppages.
- Driver's and loader's stations are not simulated.
- Exterior turret components are not simulated.

AGTS Training

AGTS INSTRUCTOR/OPERATOR

The IO is critical in AGTS training and must be well trained and highly motivated. Operation of the AGTS is simple, but quality training demands an IO with an in-depth knowledge of the tank and tank gunnery. AGTS IOs perform the following duties:

- Place the AGTS in operation.
- Prepare for AGTS training (analyze crew records, plan the training session, prepare and conduct briefings).
- Conduct prep-to-fire checks and screening exercises.
- Conduct training sessions.
- Conduct AARs.
- Power down the AGTS.
- Perform operator maintenance.
- Maintain crew records.

SENIOR INSTRUCTOR/OPERATOR

The SIO is the subject matter expert on the AGTS; he is the only person who can certify new IOs and make changes in the AGTS training management subsystem. The SIOs perform the following duties:

- Train new IOs using the exportable training packet.
- Supervise IOs, to include:
 - Inspect AGTS training.
 - Maintain IO proficiency.
 - Evaluate training.
- Recertify IOs annually.
- Help the unit commander set up an AGTS training program.
- Serve as training manager, as directed.
- Manage AGTS training records.
- Reposition crews in the matrix.

MASTER GUNNER

The master gunner should be IO certified and should attend the SIO course. He performs the following duties:

- Helps the unit commander plan and implement the total gunnery program.
- Ensures gunnery skills are taught to standard (quality control).
- Coordinates with the SIO on matters pertaining to the AGTS.

TRAINING MANAGER

The battalion S3 and master gunner manage the AGTS training program. The training manager should attend the following training:

- AGTS Instructor/Operator Course (NET or ETP certified).
- Senior Instructor/Operator Course (USAARMS).

Training with AGTS

AGTS CREW TRAINING PROGRAM SOFTWARE

The AGTS crew training program is very similar to the advanced matrix on the COFT. The crew training program consists of basic gunnery, advanced gunnery, sustainment, and special-purpose exercises that are designed to train fully operational precision gunnery and battlesight gunnery techniques. The training program also trains the crew coordination required for the execution of precision and degraded-mode engagements.

BASIC-GUNNERY EXERCISES

The basic-gunnery exercises are comprised of 11 different exercises, which are based on the Tank Table VIII tasks from FM 12-12-1-1/-2, *Tank Gunnery (Abrams)*. These exercises are completed in linear order; the first seven exercises are basic pre-live fire (BPLF) exercises. Once the seven BPLF exercises are successfully completed, the crew will conduct a complete gate-to-live-fire (GTLF) exercise, consisting of ten Tank Table VIII tasks. The scoring criteria for passing the GTLF exercises is in accordance with the qualification standards set forth in FM 17-12-1-2, Chapter 15.

ADVANCED-GUNNERY SKILLS EXERCISES

Advanced-gunnery skills exercises are grouped into three skill levels. Each skill level consists of 36 unique exercises, for a total of 108 different exercises. The difficulty level in each skill level increases as the tank crew progresses through the training program, see Table 5-1.

SUSTAINMENT EXERCISES

The sustainment exercises are selected randomly by the computer from all three of the advanced skill levels, with the conditions from Skill Level 3 applied. Crews in sustainment training will find that these exercises continue to be extremely challenging and reinforce their combat critical gunnery skills.

SPECIAL-PURPOSE EXERCISES

There are 43 special-purpose exercises in the AGTS exercise library. These exercises are divided into 10 groups. Exercises in this library are designed to familiarize crews with the AGTS and train specific tasks, which are not included in the crew training program matrix. The ten groups within the special-purpose exercises are:

- Orientation/familiarization.
- Acquisition/manipulation.
- CITV target hand-off.
- IVIS message generation.
- OIP gunnery.
- Coax machine gun gunnery.
- Long range gunnery.
- Evasive helicopter.
- Killer tank.
- Boresight/zero/LFAS.

EXERCISE LIBRARY FOR AGTS CREW TRAINING PROGRAM	
Basic Pre-Live Fire	7 Exercises
Gate to Live Fire	4 Exercises
Group 1	36 Exercises
Group 2	36 Exercises
Group 3	36 Exercises
Group 4 Sustainment	108 Exercises
Special Purpose	43 Exercises

Table 5-1. Exercise library for AGTS crew training program.

TANK GUNNERY TABLES ON AGTS

Tank Tables I through III can be trained on the AGTS using the guidelines outlined in Table 5-2.

AGTS	
Table I	Completion of Advanced Skill Level I
Table II	Completion of Advanced Skill Level I
Table III	Completion of Advanced Skill Level I

Table 5-2. AGTS tank gunnery tables.

TRAINING GUIDELINES

The TC and gunner should master the preparatory tank gunnery training requirements as outlined in FM 17-12-1-2, Chapter 13, before beginning AGTS training. Although the AGTS can be used for part of this training, it is more efficient to train to minimum proficiency before training on the AGTS.

Crews should be required to complete all seven BPLF exercises and qualify on a GTLF exercise (live-fire prerequisites) during an intense initial training period. For an average TC/gunner combination, this intense initial training phase should take approximately 10 hours of trainer time (5 2-hour training sessions). The goal for completing the intense training phase should be within 45 days of the TC/gunner combination being battle-rostered.

Minimizing crew turbulence is crucial to ensuring all battle-rostered crews receive four hours of AGTS training monthly, as a minimum. The goal of only 20 percent of battle-rostered crews being in the intensive training phase should be used to ensure all crews receive adequate training time.

Training milestones for AGTS and the approximate time to achieve them are shown in Table 5-3.

AGTS TRAINING MILESTONES		
Milestone	Description	Training Time (approximate)
Initial Training	Initial training consists of tank gunnery training before beginning AGTS training. The following skills are trained in the initial phase: <ul style="list-style-type: none"> • Use of the fire control system (GCDP, CID, CITV). • Issuing and responding to fire commands. • Proper engagement techniques and procedures. • Target acquisition and identification. • Laying the main gun for direction, including target designate. 	35 to 40 hours
Intensive Training	Intensive training on the AGTS is used to build gunnery skills to a level that can be retained with less frequent training sessions. Crews should attain the following level within the intensive phase: <ul style="list-style-type: none"> • Pass the seven basic prelive-fire exercises. • Complete a gate-to-live-fire exercise with a passing score. 	8 to 12 hours
Basic Gunnery Training	Advanced Skill Level 1.	10 to 15 hours
Intermediate Gunnery Training	Advanced Skill Level 2.	18 to 24 hours
Advanced Gunnery Training	Advanced Skill Level 3.	26 to 30 hours
Sustainment Training	Random exercises from the entire matrix, with combat conditions.	Unlimited replications

Table 5-3. AGTS Training Milestones.

Once crews have reached the minimum prerequisites to live fire, they should continue to progress through the matrix using computer recommendations, attempting to reach the sustainment level. It is not recommended that crews be moved back in the crew training program after completion of a gunnery cycle. The crew training program is designed to continue to train combat-critical gunnery skills under progressively more difficult conditions.

The training schedule for one training day on the AGTS is the same as shown in Chapter 4, Table 4-5, page 4-12, this manual.

Note. The two crews in the Headquarters Tank Section are usually attached to one of the line companies and share in that line company's 60 hours of AGTS training time; each of the 16 crews receive 3.75 hours of AGTS time. By adding only 2 training sessions on any day during the week, all 16 crews would receive their recommended 4 hours of AGTS time per month.

AFTER-ACTION REVIEW

The evaluation software and various page printouts provide an extremely comprehensive data package for an IO to conduct an AAR on the crew's performance. In addition to these page printouts, the IO should utilize handwritten notes and instant recall to emphasize training strengths and weaknesses. An AAR should take no longer than 15 minutes to prepare and conduct. Once the AAR is complete and the training session has been concluded, the various page printouts and the session summary for the crew should be placed with their records. This is particularly important for the next IO to conduct a training session with the crew, as it provides the IO the means to review the strengths and weaknesses of the firing crew, and conduct an effective prebrief.

System Information

For more information about the AGTS, to include future upgrades and general information, contact the Senior Instructor Operator Section, Hill Hall, Fort Knox, KY, (DSN) 464-5364, (Commercial) 502-624-5364 or Crew Gunnery Doctrine Branch, DTDD, COFT Subject Matter Expert, Fort Knox, KY, (DSN) 464-5806/3633, (Commercial) 502-624-5806/3633.